

DIRECT ANTIFREEZE COOLED FUEL CELL

Abstract of the Disclosure

5 A direct antifreeze cooled fuel cell is disclosed for
producing electrical energy from reducing and process
oxidant fluid streams that includes an electrolyte secured
between an anode catalyst and a cathode catalyst; a porous
anode substrate secured in direct fluid communication with
and supporting the anode catalyst; a porous wetproofed
cathode substrate secured in direct fluid communication
with and supporting the cathode catalyst; a porous water
transport plate secured in direct fluid communication with
10 the porous cathode substrate; and, a direct antifreeze
solution passing through the porous water transport plate.
In operation of the fuel cell, because product water
generated electrochemically at the cathode catalyst flows
away from the cathode catalyst into the porous cathode
15 substrate and into the porous water transport plate and
because the porous cathode substrate is wetproofed, the
antifreeze solution passing through the porous water
transport plate remains essentially within the water
transport plate. A preferred direct antifreeze solution is
20 glycerol. In a preferred embodiment, the direct antifreeze
solution passing through the water transport plate may be
directed to flow at a pressure that is less than a pressure
of the process oxidant stream passing adjacent the cathode
substrate and water transport plate to further minimize
25 movement of the antifreeze solution from the water
transport plate to the cathode catalyst.